

REMARKS

Receipt of the office action mailed April 6, 2011 is acknowledged. Claims 1-6 are pending in the application. Claims 1, 2, 4 and 5 are rejected under 35 U.S.C. §102(b) as being anticipated by the newly-cited Edlund (U.S. Patent No. 3,942,806). Claims 3 and 6 are rejected under 35 U.S.C. §103(a) as being unpatentable over Edlund in view of Balsells (U.S. Patent No. 4,890,937). In keeping with the foregoing amendments and the following argument, reconsideration of the rejected claims is respectfully requested.

Claim 1 is amended and now positively recites, in part, a pressure variation reducing means disposed between the main seal means and the sub-seal means, and that has a variation reducing space connected only to a gap formed between the two seal surfaces, with the variation reducing space being closed by the main seal means and the sub-seal means such that the variation reducing space is disconnected from atmosphere. Further, the variation reducing space is formed by a concave portion formed in one of the two seal surfaces. The amendment finds support at least in paragraphs 0026, 0057, 0074-76, and throughout the Figures. Therefore, the amendment adds no new matter.

In accordance with an aspect of claim 1 as amended, a pressure variation transmitted from the sub-seal means toward the main seal means can be reduced in the variation reducing space. For this reason, it is possible to inhibit a rapid change in the pressure of the gas surrounding the main seal means. Consequently, a device assembled in accordance with the teachings of amended claim 1 can be used with a gas that has a high permeability with respect to the rubber member, without the occurrence of a blister phenomenon in the main seal means. As a result, it is possible to inhibit or prevent the reduction in the sealing ability of the main seal means.

By comparison, Edlund does not disclose or suggest the arrangement of amended claim 1. Although the action alleges that Edlund discloses a variation reducing space formed between the main seal means and the sub-seal means, Edlund merely discloses an annular (ring-shaped) passage formed between the main seal means and the sub-seal means. That is, the cross-section of the space 28 between the seals 21 and 22 is bounded by the linear wall (in cross-section) of the machine 26 and the linear wall (in cross-section) of the rod 10. The reference wholly fails to disclose or suggest the variation reducing space, much less a variation

reducing space formed by a concave portion formed in at least one of the two seal surfaces (i.e., in the machine 26 or in the rod 10). Consequently, claim 1 as amended defines over the cited reference, and claim 1 is in allowable form for at least this reason.

Moreover, the straight-walled approach of Edlund does not and cannot address the blistering problem, because the cross-section of the passage between the main seal means and the sub-seal means is substantially constant. However, in accordance with an aspect of the present invention, blistering can be prevented or reduced by providing a variation reducing space formed by a concave portion formed in at least one of the two seal surfaces, and between the main seal means and the sub-seal means. By forming the variation reducing space having a larger passage cross-sectional area than the passage formed between the main seal means and the sub-seal means, it is possible to suppress the blistering phenomenon.

The straight-walled, constant volume approach of Edlund, which lacks any kind of concave portion formed in at least one of the two seal surfaces, simply cannot function to suppress the occurrence of the blister phenomenon. Therefore, the invention of the present application is able to achieve improved properties (reduction in blistering) that simply are not achievable by incorporating the teachings of Edlund. Thus, the subject-matter of claim 1 is non-obvious over Edlund. Consequently, claim 1 is in allowable form, as are dependent claims 2 and 3.

Claim 4 is amended to recite, in part, an enclosed pressure variation reducing space disposed between the main seal and the sub-seal and in flow communication with the gap, the pressure reducing space closed by the main seal and the sub-seal, with the pressure variation reducing space formed at least in part by a concave portion formed in either of the two seal surfaces and between the main seal and the sub-seal, the concave portion forming a volume arranged to inhibit occurrence of a blistering phenomenon in the main seal.

Once again, by comparison Edlund does not disclose or suggest the limitations of claim 4. Incorporating by reference the arguments presented above with respect to claim 1, claim 4 is novel and non-obvious over Edlund. Consequently, claim 4 is in allowable form, as are dependent claims 5-6.

In view of the foregoing, the above-identified application is in condition for allowance. In the event there are any remaining issues that the Examiner believes can be resolved by telephone, the Examiner is respectfully invited to contact the undersigned attorney at (312) 474-6300.

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Respectfully submitted,

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